Remarks/Arguments

The Applicants respectfully request reconsideration in light of the amendments made above and the arguments made below. Claims 1-13, 15-36, 38-50, 52, and 53 were pending in this application. Within the previous Office action, mailed July 21, 2008, claims 52 and 53 are objected to, and claims 1-13, 15-36, 38-50, 52, and 53 are rejected under 35 U.S.C. § 103. By way of the above amendments, claim 54 has been added. Accordingly, claims 1-13, 15-36, 38-50, and 52-54 are now pending.

Rejections under 35 U.S.C. § 103

Claims 1, 4, 5, 17-21, 24, 27, 28, 40-44, 48, and 50

Within the Office action, claims 1, 4, 5, 17-21, 24, 27, 28, 40-44, 48, and 50 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 7,020,086 (Juttner) in view of "what was well-known in the art." The Applicants respectfully disagree with these rejections.

Juttner is directed to "practical QoS routing, which provides a solution to the delay constrained least cost routing problem." (Juttner, Abstract) At column 11, lines 38-52, Juttner discloses generating a modified cost function by summing products of multiplicands λi and constraints d_i. As admitted in the Office action, Juttner does not disclose modeling negative exponential equations for deriving first and second metrics, as recited in the independent claims 1 and 24. In support of the rejection under § 103, it is stated that modeling using exponential equations was well known in the art.

Within the Office action it is thus argued that (1) using negative exponential functions was well known in the art for describing some decreasing attributes, and (2) it would have been obvious to modify Juttner to use negative exponential functions. The Applicants respectfully disagree.

Juttner calculates sums of modified cost functions, not negative exponentials. The entire invention in Juttner is directed to a Lagrange method that is "polynomial in running time, and produces a theoretical lower bound (i.e. optimal solution), along with the result." (Juttner, Abstract) Using separate equations to describe different sections of the curves shown in Figure 9 would require calculating both exponential *and* polynomial equations. This added complexity would change the calculations and the running times on which Juttner is based.

Furthermore, the algorithms used to perform the Lagrange relaxation method and thereby calculate constraints such as λ_i values (e.g., Juttner, col. 12, lines 26-61) is different from the

exponential products calculated in accordance with the present invention.

It was not well known to model negative linear exponential equations to derive metrics in accordance with the present invention.

Within the Office action it is stated that "at the time of the invention the use of negative exponents in exponential equations was well-known in the networking art for describing an attribute of decreasing value such as the context of decay functions, degradation curves and damping rates." Within the Office action it is thus argued that exponential values were generally used for some purposes and then concludes that it was well known for the specific purpose of modeling equations to derive metrics. The Applicants respectfully disagree with this conclusion. The Applicants submit that the specific element recited–modeling negative linear exponential equations for deriving first and second metrics–was not well known in the art when the application was filed.

The present application discloses estimating performance degradation versus one-way delay and loss using negative linear exponential equations (page 7, line 32, to page 8, line 4). The present application also discloses the useful characteristic that metrics modeled by negative linear exponential equations can be combined by multiplying them together (page 8, lines 21-27). These uses of negative linear exponential equations, recited in the claims of the present invention, were not well known in the art.

If the examiner maintains that using exponential functions to derive metrics as recited in claims 1 and 24 was well known in the art when the application was filed, the Applicants respectfully ask the examiner to provide evidence of this. M.P.E.P. § 2144.03(C) (Rev. 6, Sept. 2007).

It would not have been obvious to use exponential equations in Juttner because doing so would change its principle of operation, render it unsatisfactory for its intended purpose, or both.

Even if using negative exponential equations in accordance with the present invention had been well known in the art (it was not), the rejections under § 103 are still improper because modifying Juttner to use negative exponentials would change its principle of operation, render it unsatisfactory for its intended purpose, or both. M.P.E.P. §§ 2143.01(VI) and (V) (Rev. 6, Sept. 2007)

Juttner is directed to solving an optimal path by combining the well-known Dijkstra algorithm with the Lagrange relaxation technique. (Juttner, col. 5, lines 41-43) Juttner provides

solutions that use polynomial equations and explains that "by . . . relaxing the desire for an optimal solution, an option is provided to control the tradeoff between running time of the algorithm and quality of result." (Juttner, Abstract) In all of its embodiments and in each independent claim, Juttner discloses using "Lagrange relaxation." If Juttner were modified to model negative linear exponential equations to derive metrics, its principle of operation–based on Lagrange relaxation–would be changed.

Moreover, Figure 9 of Juttner (cited in the Office action) discloses a cost versus delay constraint graph having increasing and decreasing portions. Within the Office action it is stated that "it would have been obvious that *this portion* of the Juttner curve [the decreasing portion] may be described using negative exponents in exponential equations" (italics added). Characterizing this graph with a combination of linear functions and exponential (for the decreasing portion) functions would likely increase the processing required–a result contrary to the goal of the invention–rendering Juttner unsatisfactory for its intended purpose.

Within the Advisory action mailed October 23, 2008, it is stated that this increase in processing time "will not be significant, that Juttner will continue to operate within acceptable boundaries and thus rendering said use of negative exponentials obvious." The Applicants submit that one skilled in the art would not modify Juttner when doing so would (1) decrease processing time, in any way, and (2) change the principle of operation, from using sums of products, which lend themselves to algebraic solutions, to using exponential functions.

For at least these reasons, it would not be obvious to modify Juttner to model negative linear exponential equations to derive metrics as in accordance with the present invention.

Claim 1 is directed to a method for characterizing a quality of a network path, including a first segment and a second segment. The method includes, in part, modeling negative linear exponential equations for deriving first and second metrics. The first and second metrics are at least in part quality characterizations of a same plurality of one or more network applications. Juttner does not disclose modeling negative linear exponential equations for deriving metrics, as recited in claim 1. Furthermore, as explained above, there is no motivation for modifying Juttner to use negative linear exponential equations for this or any other purpose. For at least this reason, claim 1 is allowable over Juttner.

Claims 4, 5, 17-21, 48, and 50 all depend on the allowable claim 1. Accordingly, claims 4, 5, 17-21, 48, and 50 are all also allowable as depending on an allowable base claim. Claim 51 has been canceled, so its rejection is moot.

Claim 24 is directed to a network system. The system includes, in part, a plurality of one

or more network devices configured, such that if the network device is coupled to at least a network path including a first segment and a second segment, the plurality of one or more network devices model negative linear exponential equations for deriving first and second metrics. The first and second metrics are at least in part quality characterizations of a same plurality of one or more network applications. As explained above, Juttner does not disclose modeling negative linear exponential equations for deriving metrics, as recited in claim 24. Nor is there any motivation for modifying the invention in Juttner to include this element. For at least this reason, claim 24 is allowable over Juttner.

Claims 27, 28, and 40-44 all depend on the allowable claim 24. Accordingly, claims 27, 28, and 40-44 are all also allowable as depending on an allowable base claim.

Claims 2, 3, 6-13, 15, 16, 25, 26, 29-36, 38, and 39

Within the Office action, claims 2, 3, 6-13, 15, 16, 25, 26, 29-36, 38, and 39 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Juttner in view of U.S. Patent No. 6,134,580 (Hultgren). The Applicants respectfully disagree with these rejections.

Juttner has been characterized above. Hultgren is directed to establishing a network connection between an originating node and a destination node. Hultgren describes determining an acceptable sequence of links by sending solicitations for bids to intermediate nodes along a network path and then processing the bids. Hultgren does not disclose modeling equations for deriving metrics, as recited in claims 1 and 24.

Claims 2, 3, 6-13 15, and 16 all depend on the allowable claim 1 and claims 25, 26, 29-36, 38, and 39 all depend on the allowable claim 24. As explained above, claims 1 and 24 are both allowable. Accordingly, claims 2, 3, 6-13, 15, 16, 25, 26, 29-36, 38, and 39 are all allowable as depending on allowable base claims.

Claims 22, 23 and 45-47

Within the Office action, claims 22, 23, and 45-47 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Juttner in view of U.S. Patent No. 7,002,917 (Saleh). The Applicants respectfully disagree with these rejections.

Juttner has been characterized above. Saleh is directed to a method of finding a path in a network. Saleh discloses determining minimum-hop and minimum cost paths. Saleh does not disclose modeling equations for deriving metrics, as recited in claims 1 and 24.

Claims 22 and 23 both depend on the allowable claim 1 and claims 45-47 all depend on

the allowable claim 24. As explained above, claims 1 and 24 are both allowable. Accordingly, claims 22, 23, and 45-47 are all allowable as depending on allowable base claims.

Claim 49

Within the Office action, claim 49 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Juttner in view of U.S. Patent No. 7,085,230 (Hardy). The Applicants respectfully disagree with this rejection.

Juttner has been characterized above. Hardy is directed to determining a level of performance for a communication service. Hardy does not disclose modeling equations for deriving metrics, as recited in claim 1.

Claim 49 depends on the allowable claim 1. As explained above, claim 1 is allowable. Accordingly, claim 49 is also allowable as depending on an allowable base claim.

Objections to the claims

Within the Office action, it is stated that claims 52 and 53 are objected to as being dependent upon a rejected base claim, but they would be allowable if rewritten in independent form to include all the limitations of the base claim and any intervening claims.

Claims 52 and 53 both depend on the allowable claim 1. Accordingly, claims 52 and 53 are also both allowable as depending on an allowable base claim.

The new claim 54 is allowable.

The new claim 54 is directed to a method of characterizing a quality of a network path, including a first segment and a second segment. Claim 54 recites, in part, using *products* of negative exponential functions for deriving first and second metrics, wherein the first and second metrics are at least in part quality characterizations of a same plurality of one or more network applications. Claim 54 further recites, the first metric and the second metric are at least partly a function of a same plurality of one or more elementary network parameters whose individual performance is modeled using a negative exponential function. As explained above, none of the cited references disclose using negative exponentials, much less products of negative exponentials. Nor do any of the cited references disclose metrics that are a function of network parameters whose individual performance is modeled using a negative exponential function. For at least these reasons, claim 54 is allowable over the cited references.

The limitation of using products of negative exponentials is not new matter. It finds

support in the application, such as at page 8, lines 21-24. The limitation "whose individual performance is modeled using a negative exponential functions" is also not new matter. It finds support in the application, such as at page 7, line 32, to page 8, line 4.

Using the product of negative exponentials provides advantages over the prior art. If each of the negative exponentials represents an individual metric (e.g., loss or delay), the result of the product of negative exponentials (another negative exponential) can be interpreted as a compound metric with the following properties:

1. If any of the individual metrics is bad, the compound metric is also bad.
2. If both of the individual metrics are just marginally bad, or not bad enough when considered in isolation to be noticeable, the compound metric would be worse than each of the two individual metrics, thereby capturing a negative effect that would not otherwise be seen in each of the individual metrics in isolation.

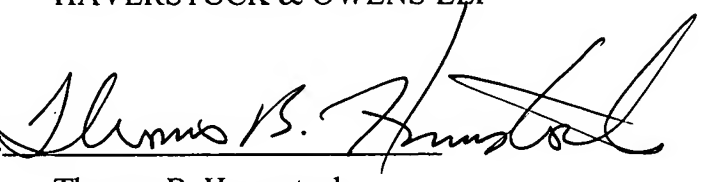
These properties of the compound metric are possible because of the product operations applied to negative exponentials: the product of negative exponentials is another negative exponential that is, at most, as large as any of the two individual multipliers. This advantage is not found in any of the cited prior art.

CONCLUSION

For the reasons given above, the Applicants respectfully submit that claims 1-13, 15-36, 38-50, and 52-54 are in condition for allowance, and allowance at an early date would be appreciated. If the Examiner has any questions or comments, the Examiner is encouraged to call the undersigned at (408) 530-9700 so that any outstanding issues can be quickly and efficiently resolved.

Respectfully submitted,
HAVERSTOCK & OWENS LLP

Dated: 11-24-08

By: 

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